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13281 U.S. PTO

**GOLF CLUB HEAD HAVING AN ALIGNMENT MARKER ON ITS STRIKE FACE****FIELD OF THE INVENTION**

[001] The present invention relates to metal golf club heads and, more particularly, to the strike face of metal golf club heads.

**DESCRIPTION OF THE RELATED ART**

[002] The ideal location to strike a golf ball on a metal wood head, such as driver, is typically at or very near the geometric center of the strike face. This is often termed the “sweet spot” of the strike face. Many golfers have difficulty striking golf balls at the sweet spot, especially with oversized club heads. To assist golfers in striking golf balls at the sweet spot of the strike face, many club heads include score lines on the strike face that roughly surround the sweet spot. Unfortunately, strike lines are difficult to identify when addressing a golf ball.

**SUMMARY**

[003] In light of the above-described problems of some conventional golf club heads, some embodiments of the present invention generally strive to provide a golf club head having an alignment marker on its strike face. The alignment marker assists golfers in aligning a golf ball with the geometric center of the strike face when addressing the golf ball.

[004] In accordance with one embodiment, the invention concerns a golf club head having a hollow metal body with a metal strike face. The metal strike face has a coating applied thereto of a first hue of color that defines an alignment marker for a golfer. The decorative coating covers at least 10% of an entire surface area of the metal strike face, covers the geometric center of the strike face, is bounded by at least a second hue of color that is different than the first hue of color, and does not extend to a periphery of the metal strike face. The coating has physical properties that do not affect a launch angle and spin rate of a golf ball hit with the golf club head.

[005] In accordance with another embodiment, the invention concerns a method of creating an alignment marker on a metal strike face of a golf club head by creating a surface finish in the metal strike face, applying a coating to the metal strike face, and buffing the coating on the metal strike face.

[006] Other advantages and features associated with the embodiments of the present invention will become more readily apparent to those skilled in the art from the following detailed description. As will be realized, the invention is capable of other and different embodiments, and its several details are capable of modification in various obvious aspects, all without departing from the invention. Accordingly, the drawings in the description are to be regarded as illustrative in nature, and not limitative.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

[007] Figure 1 is perspective view of a golf club head in accordance with a first embodiment of the present invention.

[008] Figure 2 is a front view of the strike face of the golf club head illustrated in Figure 1.

[009] Figure 3 is flow diagram illustrating a method of fabricating an alignment marker on the metal strike face of the golf club heads illustrated in Figure 1.

### **DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS**

[0010] Figure 1 illustrates one embodiment of a golf club head 20 in accordance with the present invention. The golf club head 20 is attached to a golf shaft (not illustrated) to form an assembled golf club (not illustrated). As illustrated in Figure 1, the golf club head 20 has a front strike face 22 that strikes a golf ball when a golfer swings the club. The strike face 22 includes a periphery defined by a top edge 24, a bottom edge 26, a toe edge 28, and a heel edge 30. The golf club head 20 also includes a backside 32 located opposite from the front strike face 22 and that defines the trailing edge of the club head 20 when a golfer swings the club. The golf club head 20 also includes a heel 34, a toe 36 located opposite from the heel, and a hosel 38 that receives the shaft of the golf club. The golf club head 20 further includes a crown 40 that defines the top

of the golf club head, and a sole located opposite from the crown. The sole adjoins the bottom edge 26 of the strike face 22 and extends rearward in a direction toward the backside 32 until it adjoins the backside, and also extends in a direction toward the heel 34 and toe 36.

[0011] The golf club head 20 has a hollow body defined by a metallic wall. The metallic wall defines the perimeter of the golf club head 20, including the metal strike face 22. In this manner the golf club head 20 is perimeter weighted. The metallic wall includes an interior surface that faces an interior of the golf club head 20. The metallic wall also includes an exterior surface that faces an exterior of the golf club head 20. In the preferred embodiment, the interior of the golf club head is empty, having no material therein except for a gas, such as air. However, in alternative embodiments of the golf club head 22, the interior may be filled with a substance such as foam and/or may include reinforcement bars or ridges therein, yet still be considered “hollow.”

[0012] As is illustrated in Figures 1 and 2, the metal strike face 22 includes an alignment marker or strike marker 40. The alignment marker 40 assists golfers in aligning a golf ball with the geometric center *C* of the strike face when addressing the golf ball to help golfers avoid hitting off-center shots. However, the alignment marker 40 does not affect the launch angle and spin rate of a golf ball hit with the golf club head. The alignment marker 40 does not affect the launch angle and spin rate of a golf ball hit with the golf club head because the alignment marker does not alter or change the physical properties of the strike face 22 that affect the launch angle and spin rate, such as the coefficient of friction and hardness of the strike face. That is, the alignment marker 40 serves no other function than assisting the golfer in aligning a golf ball with the geometric center *C* of the strike face when addressing the golf ball before or during the golf swing. As is illustrated in Figure 2, the alignment marker 40 covers the geometric center *C* of the strike face 22, i.e., the “sweet spot” of the strike face, located along the ideal driving or strike line for the club head.

[0013] The alignment marker 40 covers at least 10%, preferably at least 20%, and more preferably at least 30% of the entire surface area of the metal strike face – while still covering the geometric center *C* of the strike face. In a particularly preferred embodiment, the alignment marker 40 covers approximately 40% of the entire surface area of the metal strike face, including

the geometric center *C*. Additionally, to assist a golfer in identifying the alignment mark at address, the alignment marker 40 is preferably a hue of color that is different than that of the area 42 that bounds the alignment marker, i.e., the remainder of the strike face. The differing hues may be different colors, different gradations of the same or different colors, or different shades and tints of the same or different colors. In the preferred embodiment of a driver, the alignment marker 40 is a dark grey color, i.e., a shade of black, while the area 42 bounding the alignment marker is that of the exposed metal of the strike face, namely that of buffed Beta Titanium alloy 2041. In a preferred embodiment of a fairway wood, the alignment marker 40 is a dark grey color, i.e., a shade of black, while the area 42 bounding the alignment marker is that of the exposed metal of the strike face, namely that of buffed 465 marajing steel. In an alternative embodiment, the alignment marker 40 is a dark grey color, i.e., a shade of black, while the area 42 bounding the alignment marker is a lighter grey color, i.e., another shade of black. In a further embodiment, the alignment marker 40 is white, while the area 42 bounding the alignment marker is a shade of black or pure black. In yet another embodiment, the alignment marker 40 is red, while the area 42 bounding the alignment marker is the hue of exposed metal.

**[0014]** To assist golfers in aligning a golf ball with the geometric center of the strike face when addressing the golf ball, the alignment marker 40 does not extend to the periphery of the strike face 22, which is defined by the top edge 24, bottom edge 26, toe edge 28, and heel edge 30. That is, the edge 44 of the alignment marker 40 does not intersect the top edge 24, bottom edge 26, toe edge 28, and heel edge 30. In an embodiment in which the golf club head 20 is a driver, the distance *w* between the most extreme bottom edge of the alignment marker to the bottom edge 26 is approximately 1 cm, the distance *x* between the most extreme top edge of the alignment marker and the top edge 22 is approximately 1 cm, the distance *y* between the most extreme toe edge of the alignment marker and the toe edge 28 is approximately 1.8 cm, and distance *z* between the most extreme heel edge of the alignment marker and the heel edge 28 is approximately 2.0 cm. In another embodiment in which the golf club head 20 is a fairway wood, the distance *w* between the most extreme bottom edge of the alignment marker and the bottom edge 26 is approximately 3 mm, the distance *x* between the most extreme top edge of the alignment marker and the top edge 22 is approximately 1.5 cm, the distance *y* between the most extreme toe edge of the alignment marker and the toe edge 28 is approximately 1.5 cm, and

distance  $z$  between the most extreme heel edge of the alignment marker and the heel edge 28 is approximately 1.5 cm.

[0015] In the illustrated embodiment, the alignment marker 40 is in the shape of an ellipse. However, the alignment marker 40 is shaped differently in other embodiments. For example, in an alternative embodiment, the alignment marker 40 is in the shape of a circle. In another embodiment, the alignment marker is a square. In a further embodiment, the edge 44 of the alignment marker is spaced from, but follows the shape of the periphery of the strike plate 22.

[0016] In an embodiment of the golf club head 20 in which the loft is that of a driver, the golf club head 22 is preferably fabricated from titanium alloy casings that are welded to each other to define the golf club head 20. In an embodiment of the golf club head 20 in which the loft is that of a fairway wood, the strike face 22 is a casing of 465 steel, while the remainder of the body is a casing of 17-4 stainless steel. These two casings are welded to each other to define the golf club head 20. In each of these embodiments, the portion of the metallic wall that defines the strike face 22 is located entirely within one casing. In other embodiments, the metallic wall is a material other than titanium alloy and/or a stainless steel, such as aluminum alloys and magnesium alloys.

[0017] After the metallic body of the golf club head 20 has been fabricated, the alignment marker 40 is created according to the process illustrated in Figure 3. As is set forth in Figure 3, at a step 50, a surface finish is created in the strike face 22. In a preferred embodiment, a 180 grit scratch surface finish is created in the bare, exposed metal of the strike face with a sand paper wheel. In alternative embodiments, the surface finish is finer or coarser, but preferably conforms to USGA standards. In alternative embodiments, the surface finish is formed in the strike face 22 by other techniques, such as by machining, grinding, etching, etc.

[0018] After the strike face 22 has been surface-finished, at step 52, the strike face 22 is masked such that the only exposed portion of the face is that where the alignment marker 40 should be finally located. Thereafter, at a step 54, a preface of the alignment marker 40 is created by applying a very thin coating of a material to the unmasked area of the strike face 22. In the preferred embodiment, a plastic, polyvinylidenefluoride (PVDF), is uniformly sprayed on the

strike face at 400°C to create a coating less than .001 inches thick, more preferably less than .0005 inches thick. In other embodiments, the PVDF is at lower temperatures, but is preferably above 300°C. In further embodiments, other materials are used to coat the alignment marker 40, such as other plastics, metal oxides, paints, dyes, and ceramics.

[0019] After the preface of the alignment marker 40 is created by applying the coating to the unmasked area of the strike face 22, the mask is removed at step 56. The alignment marker is then completed at step 58 by buffing (polishing) down the coating. In the preferred embodiment, the coating is buffed down to slightly below or at the edges of the previously applied surface finish scratches such that the coating primarily or substantially only resides in the valleys of the surface finish scratches of the metal strike face. In this manner, an entirety of the metal strike face has a substantially uniform surface finish and a substantially uniform hardness, namely that of the surface-finished metal. Thus, the alignment marker 40 does not substantially alter or change the physical properties of the strike face 22. Because the alignment marker 40 does not substantially alter or change the physical properties of the strike face 22, such as the coefficient of friction and hardness of the strike face, it will not substantially, i.e. measurably, affect the launch angle and spin rate of a golf ball hit with the golf club head 20 as compared to an identical golf club head that does not include the alignment marker 40. Hence, other than assisting a golfer in aligning a golf ball with the geometric center of the strike face 22, the alignment marker 40 does not measurably affect the performance of the golf club head.

[0020] As will be appreciated, the order of the steps illustrated in Figure 3 can be varied in accordance with other embodiments of the present invention. For example, in an alternative embodiment, the surface finish is created after applying the coating. Additionally, some of the steps illustrated in Figure 3 can be omitted. For example, in one embodiment, the surface coating is applied without the use of a mask. In another embodiment, the coating is applied so thinly that it does not measurably affect the launch angle and spin rate of a golf ball hit with the golf club head 20. In a further embodiment, the coating is thicker than that described above but is of a material having physical properties that do not measurably affect the launch angle and spin rate of a golf ball hit with the golf club head 20.

**{0021}** The principles, preferred embodiments, and modes of operation of the present invention have been described in the foregoing description. However, the invention which is intended to be protected is not to be construed as limited to the particular embodiments disclosed. Further, the embodiments described herein are to be regarded as illustrative rather than restrictive. Variations and changes may be made by others, and equivalents employed, without departing from the spirit of the present invention. Accordingly, it is expressly intended that all such variations, changes and equivalents which fall within the spirit and scope of the present invention as defined in the claims be embraced thereby.